WISCONSIN HISTORICAL SOCIETY
DIVISION OF HISTORIC PRESERVATION
LAND INFORMATION MODERNIZATION AND INTEGRATION PLAN

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I. Executive Summary

This Land Information Modernization and Integration Plan has been prepared and reviewed by Richard W. Dexter and Margaret V. Buck from the Division of Historic Preservation of the Wisconsin Historical Society.

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The Division of Historic Preservation of the Wisconsin Historical Society has custodial responsibility for maintaining records and other data on the following:

- historically and architecturally significant buildings and structures
- human burial sites
- terrestrial and underwater archeological sites

The responsibility of custodianship by the State Historic Preservation Office was mandated through federal regulations (36 CFR 60, 61 and 800) as well as Wisconsin State law (Wis.Stats. 44.34, "Duties of the State Historical Society.", and Wis.Stats. 157.70, "Burial Sites Preservation").

In 2000, Historic Preservation was awarded an ISTEA grant through the WiscDOT, and, with matching funds, contracted the IT consulting firm GeoAnalytics,Inc. to help with the following:

- the migration of all databases to an Oracle DBMS system
- the development of four web-based applications allowing internal (and external) users access to the databases

- the creation of digital map coverages (in the format of ArcView shapefiles) of all historic properties, archeological and burial sites for the State.

As of March 2002, we are in the final enhancement stage of the development of the Web-based applications, and are in the process of correcting and documenting the GIS shapefiles, as well as enhancing our ArcIMS capabilities. We plan to make this data accessible to external users within the next six months.

Future plans to increase access to WHS records include digitizing the complete underwater archeological sites database, as well as scanning archived historical maps for viewing access via the Internet.

II. The Five Technology Architectures

A. Applications Architecture

1. Identify and characterize the major applications that incorporate land information or GIS/LIS.

The major applications that incorporate land information at the Wisconsin Historical Society are the database and GIS applications maintained by the Division of Historic Preservation.

- There are five applications in total: Archaeological Sites Inventory (ASI), Architectural and Historic Properties Inventory (AHI), Bibliography of Archaeological Reports (BAR), Compliance (dedicated to the Office of Preservation Planning), and an Administrative Application.

- The ASI, AHI, BAR and Compliance Internet applications have an integrated Internet Map Server component, developed using ArcIMS.

- The Wisconsin National Register and State Register Database: http://www.wisconsinhistory.org/histbuild/register/welcome.asp
  This is a public access website which provides users with information on sites throughout Wisconsin listed on the National Register and State Register of Historic Places. Land information is incorporated into the database, and users are able to search the listings based on geographic criteria.

- The Underwater Archaeology Program from within the Office of the State Archaeologist is currently developing a website application for searching their database of shipwreck and other underwater archaeological sites identified throughout the state (mainly in the waters of Lakes Michigan and Superior).

2. Include a discussion of high-level and agency-wide land information integration efforts.

To this date, efforts to integrate land information within the Historical Society have been limited to the Division of Historic Preservation. Other Divisions within the Society manage and develop data that incorporate land information, including the Library and Archives Division as well as the Museum Archaeology Division. It was a significant challenge and success to pull the various databases of land information managed within the Division of Historic Preservation into a similar format where they could be interpreted and understood with the same "language". Ideally, the next step will be for the Division of HP to reach out to other Divisions that document and manage spatially referenced information in order to create a higher level of integrity of land information at the Agency-wide level.

3. Identify any major GIS/LIS applications developed at the WHS.

These applications are outlined in item #1 above. The major applications at this time which integrate GIS information through an Internet Map Server are the Internet database applications, developed with the contracted help of GeoAnalytics, Inc. Version I of these databases will be considered complete and ready for wider agency and public use (through licensing) as of August 2002.

B. Information Architecture

1a. Identify the major land information data sets, and the corresponding metadata, developed, enhanced, or currently used within your agency. Particularly, identify any land information for which your agency has assumed custodianship.

The Division of Historic Preservation develops, manages, and holds custodial responsibility for four spatial data layers (directly linked to databases). These four layers are: (1) archaeological sites, (2) burial sites (modern cemeteries), (3) archaeological survey areas, and (4) historic properties.

The archaeological sites, burial sites, and archaeological survey areas are spatial data layers that are dynamically linked to the Archaeological Sites Inventory database (ASI). The historic properties spatial layer is connected to the Architecture and Historic Properties Inventory database (AHI).

The final spatial data layer in currently being migrated to a digital format is the Shipwrecks site location information as found in the shipwrecks database managed by the Underwater Archaeology program. The base maps used in the plotting of this information are the following:
National Ocean Service Charts 1:80 scale with harbor inset maps at various scales (for Lakes Michigan and Superior); US Army Corps of Engineers Upper Mississippi River

Navigation Charts; National Ocean Service Charts for the Fox River System and Lake Winnebago (at various scales).

Contact for Archaeological and Burials Sites Information:
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Leslie E. Eisenberg, (Burial Sites Preservation), (608) 264-6503, leeisenberg@whs.wisc.edu

Contact for Architectural / Historic Properties Information:
Joe R. DeRose, (608) 264-6512, jrderose@whs.wisc.edu

Contact for Shipwrecks Information:
Cathy Green, Underwater Archaeology Program, (608) 271-1382, cmgreen@whs.wisc.edu

1ai. Map Collections at WHS (mostly still in paper format)

The Archives Division
While there are many governmentally produced maps in the Wisconsin Historical Society's Archives collection, the vast majority of items in the map holdings were privately produced and acquired by purchase or donation. There are 28,000 items in the cartographic collection and approximately half are devoted to Wisconsin. The earliest depiction of what is now Wisconsin dates from about 1680, and the most recent from 1990. About five percent of the collection dates before 1800, seventy-five percent from the nineteenth century, and twenty percent from the twentieth century. The Society has a long-standing policy of acquiring through donation or purchases all Wisconsin atlases, including atlases of political and geographic subdivisions and of all available Wisconsin land ownership maps and atlases. The map holding contain a wide variety of information on land ranging from ownership to topography and land cover, and from transportation right-of-ways to prehistoric burial sites.

For land documentation, three types of maps stand out. The Archives maintains a complete collection of United States Geological Survey 7.5 minute and 15 minute quadrangle maps of Wisconsin. These date from 1888, when the first sheets were issued, to the present. The cartographic holdings contain nearly all the land ownership maps known to have been published for Wisconsin. Commonly called plat maps or atlases, they began to appear in the 1850's and today are published biennially for many counties. They show the size, configuration and owner's name for farms and rural property. Also in the holdings are Sanborn insurance maps for 334 Wisconsin cities and villages dating from 1880 to 1950. These maps show block by block the locations of utilities, and the size, the construction material, and the use of every building. They are very detailed, drawn to a scale or one inch to fifty or one hundred feet.

Map and Atlas Collections in the Archives:
- **Battle Maps:** The map collection includes many maps of specific battles for US wars from the Revolutionary to World War II. Typical battle maps show topography and troop movements.

- **Bird's Eye Views:** Bird's eye views are drawings of cities and villages as seen from an imaginary elevated viewpoint. Views were drawn by an artist who visited the city, making notes of street names and layouts, buildings and topographical features. Large cities such as Milwaukee and Madison were illustrated several times; most villages only once. The map collection includes views of over 300 Wisconsin cities and villages.
- **City Maps:** The map collection includes many city maps concentrating on the United States, the Midwest and Wisconsin. Most date from the 19th and 20th centuries. Many include ward boundaries, street directories, lists of churches, fraternal organizations, and charitable groups or show locations of important buildings, schools, cemeteries, public transportation routes and other elements of the cultural and social infrastructure.
- **County Maps:** County maps are found as sheet maps and as county atlases. These maps typically show county and township boundaries, names and locations of settlements, and topographical features in varying degrees of detail. Many will also show locations of schools, cemeteries, churches and industrial or business sites and include maps of cities and villages. The map collection holds county maps for the United States and Canada with dates ranging from around 1830 to the present.
- **Foreign Countries in Maps and Atlases:** About five percent of the map collection deals with foreign countries, mostly from northern and western Europe. Most date from the 19th and 20th centuries.
- **Gazetteers:** Gazetteers list place names in alphabetical order. Besides individually published gazetters, many world, country and state atlases include gazetteers. Some of the most useful gazetters in the map collection include Lippincott's Gazetter of the World and the gazetter of the Times Atlas of the World, Rand McNally's Commercial Atlas and Marketing Guide (many editions), Canada Gazetteer Atlas, The Atlas of Wisconsin and Wisconsin Geographic Names Alphabetical Finding List, Vollstandigstes geographisch-topographisch-statisticshes Orts-Lexicon von Deutschland, and US Board on Geographic names gazetteers for Ireland, the Soviet Union, Poland and Czechoslovakia.
- **General Land Office Survey Plats (Series 698):** Surveyors employed by the United States General Land Office surveyed Wisconsin between the 1830's and 1860's. These surveys produced a series of maps of individual townships showing topography and some cultural features such as roads, trails, Native American sites, mines, and dams.
- **General Land Office Surveyors' Notes (Series 701):** The US General Land Office Surveyors were required to make notes about soil, vegetation, and cultural features they observed as they carried out their surveys. These notes are in the form of small notebooks arranged by township.
- **General Land Office Tract Books (Series 1673):** These books record sales of land by the Federal Government to the first purchasers. The records include name of purchaser, amount of land purchased legal description of the land, price paid, and date of purchase. Personal information about the buyers is not part of the record.
- **Highway Maps:** Official state highway maps and road atlases can provide the most complete and authoritative information about transportation routes. Often available in series spanning a long time period, these maps can be used to trace the

development of transportation routes, show how an ancestor may have reached her home, and identify changes in road names and routes.

- **Historical Atlas and Chronology of County Boundaries 1788-1980:** Maps and text showing changes in county boundaries for these states: Delaware, New Jersey, Pennsylvania, Maryland, Illinois, Indiana, Ohio, Minnesota, North and South Dakota, Iowa, Missouri, Michigan, and Wisconsin.
- **Indian Reservations:** Indian reservation maps include maps of individual reservations and maps showing reservations in specific states or in the entire US.
- **Plat Maps and Atlases:** Plat maps and atlases provide names of rural property owners and show boundaries of individual landholdings, usually for a single county. Nineteenth century plat maps and atlases often include such features as illustrations of farmsteads and businesses premises, portraits and biographical sketches of prominent citizens, lists of patrons, city maps, and county and township histories. Twentieth century plat maps and atlases are usually simpler and contain only landownership information and advertisements.
- **Railroad Maps:** Two main kinds of maps show railroad information. The first type include official railroad maps prepared by state agencies which were published on a regular basis and provide reliable information on names and routes of railroads for known dates. The second type consists of individual railroads, usually produced by the railroads themselves. Some show proposed railroad developments or additions while others may highlight individual routes or publicize special services.
- **Sanborn Insurance Maps:** From the 1860's into the 1970's the Sanborn-Perris Insurance company produced detailed, large-scale maps of US cities and villages showing the construction and use of buildings. These maps show the types of construction (wood, frame, masonry), number of stories, roofing material, location of doors and windows, use (dwelling, apartment, saloon, drygoods stores, wagonmaker), and the exact location of every building mapped. Sanborn maps concentrate on the congested and built up areas of the cities, so most places were never mapped entirely. Larger cities were remapped numerous times while small villages may have been mapped only once or twice. The collection includes Sanborn maps of over 300 Wisconsin cities and villages from the mid-1880's to the 1970's.
- **State Maps:** State maps states vary in context, ranging from simple outline maps to detailed maps showing the smallest settlements and considerable topographic detail. The collection includes maps of all states dating from the late 1700's to the present.
- **State Road Papers (Series 235):** This series of manuscript maps includes plats and surveyors' field notes for roads built or planned by the territory and state of Wisconsin between the years 1835 and 1882.
- **Township Atlas of the United States:** This guide indexes named subdivisions of all US counties plus maps of census County Divisions, Minor Civil Divisions, and selected Urbanized areas.
- **United States Geological Survey Topographic Maps:** The US Geological Survey began detailed mapping of Wisconsin in the late 1890's and finished in the mid-1980's. The outstanding characteristics of the topographical maps are their large scale, accuracy and detail, including elevations, contours, names of natural and artificial features, vegetation, and civil boundaries.

- **War Atlases:** War atlases were produced by private agencies and by governments, and typically include maps of theaters of war, individual battles, fortifications, illustrations of participants and events, and weaponry. The collection includes war atlases from the Revolutionary through World War II.
- **Waterway Maps:** The importance of rivers and lakes in transportation history is illustrated by the number of river, lake, and harbor maps and surveys in the collection. These maps show changes in river courses and levels, developments of dams, canals and harbors, and topographical and cultural features of the surrounding areas.
- **Wisconsin Archaeological Atlas:** The Wisconsin Archaeological Atlas is a manuscript compilation of notes on Native American archaeological and historical sites in the state. The compilation took 30 years and although as thorough as limited time and staff allowed, is by no means complete. The atlas includes county and individual township maps showing a variety of sites, including mound groups, camp and village sites, gardens, quarries, battlefields, and cemeteries.
- **Wisconsin Land Economic Inventory (Series 1956, 1958, 1959):** The Wisconsin Land Economic Inventory reviewed the status and potential use of land in the state. Field workers surveyed the state in the 1930's, noting land cover, topographical and cultural features, and use (abandoned farmland, woodlots, cutover areas, etc.), producing three series of maps, including the original surveyors' sketch maps (series 1956) and two sets of printed maps, small scale (series 1958) and large scale (series 1959) organized by township. These maps provide a detailed view of virtually all-rural land in the state, including many references to abandoned roads and railways.
- **Wisconsin Township History Guide:** This guide records the development of civil townships in Wisconsin. Arranged alphabetically by county and township name, it provides the date of establishment for each township, the name or names of any parent townships, and any name changes.
- **Zoning Maps:** The importance of zoning in determining land use is reflected in the number of zoning maps in the collection. Most of these maps are of Wisconsin cities and counties and date from the 1930's to the present.

Contact for Archives Division Map Collections:
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Other Map and Manual Land Records

The Archives' manual land information resources were created by the federal government, Wisconsin state government, or Wisconsin's county and local governments, and were acquired by the Society in its statutorily defined role as archives for the State of Wisconsin.

The Archives holds only four series of land records created by the federal government, but three of them represent extremely important sources on the topography, vegetation, land cover, and ownership of virtually all land in the state. These three, Surveyor's Field Notes, survey Plat Maps, and Local Land Office Tract Books document the original surveying, mapping and sale of land in the state. The Field Notes (microfilm copies or

originals in the holdings of the Office of the commissioners of Public Lands) were the basis for laying out the township grid in Wisconsin and contain descriptions of topography, vegetation, and land cover before the areas were populated by significant numbers of European settlers. The Survey plats were drawn from the Field Notes and depict topography and the legal township boundaries. The Tract Books record the original sale or transfer of most land in the state from the federal government to state or private ownership.

At least one hundred twenty separate series of state government records contain land information. These resources are so varied in contact that they defy summarization. Among the concentrations are nineteenth and early twentieth century records of the office of the Commissioner of Public Lands, Secretary of State, and Treasurer documenting the administration and sale of state lands, especially school and swamp lands; purchase and administration of land by individual agencies, especially the Department of Natural Resources and its predecessor the conservation Commission; and records and data related to agricultural land uses, land cover, and resource and wildlife management collected by agencies, especially the Departments of Agriculture and Natural Resources. Also among the state government records are maps and similar records documenting matters which individual agencies regulate or monitor. For example, the Department of Public Instruction created maps showing school district boundaries and school bus routes; Public Service Commission maps and records showing areas served by different types of utilities; and records from the Department of Transportation and predecessor agencies showing highway and railroad right-of-ways.

Particularly noteworthy due to their comprehensiveness and unique content are several records series related to the Wisconsin Land Economic Inventory, a program administered at various times by the Department of Agriculture and the State Planning Board. The Inventory was conducted between 1929 and 1947 by field workers crossing the state at half miles intervals and mapping the land. The maps and other records generated by the Inventory cover every county except Milwaukee and show land and forest cover, soil types, streams and lakes, marshes, animal tallies, highways, improvements, and miscellaneous characteristics including erosion, gravel pits, orchards, beaver dams, logging camps, cemeteries, abandoned railroads, drainage ditches, bogs, and bathing beaches. Summary records give land classification and cover totals by acres, and other characteristics for each county.

Archives' county and local government sources of land information are also varied in content. Moreover, the coverage is inconsistent. These records come to the Archives at the discretion of the creating governmental units. Consequently for some localities the Archives has extensive records and for other areas very few records.

For a few counties or communities there are records of planning bodies, records of acquisition of park or other public lands, and records of land use studies. In the holdings for some counties and towns are records related to the establishment and maintenance of roads and highways and a few sets of county surveyor's records, field notes, correspondence, maps and plats. For a substantial number of counties the Archives holds

microfilm copies of nineteenth and early twentieth century Register of Deeds records and grantor/grantee indexes recording all land transactions. In all cases these deed records are copies with the original records remaining in the office which created them. By far the most numerous county and local land records related to real estate taxation. The Archives holds tax or assessment rolls for most of the state. Generally these originated with county treasurers, although if county records are not available assessment records from towns, villages, and cities are accepted. The goal has been to acquire the earliest possible property tax records from each county, to retain all such records through approximately 1900, and to retain records for every fifth year thereafter. Thus for some areas the archives has tax records dating as early as the 1830's or as late as the 1970's. Closely related to assessment and tax rolls are records of tax sales, which the Archives hold for many counties. These records document the confiscation of land for non-payment of taxes and subsequent resale.

Contact for Map and Manual Land Records:
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1b (c and d included).
Mechanisms of Access or Distribution of Land Information and Metadata

Digital geospatial data and metadata are available for licensed use through the Division of Historic Preservation. The distribution of this data will be managed through a password protected FTP site as well as by CD. All data requests will be serviced through the Division of HP, with the GIS coordinator as the principle contact. The development of these licensed user agreements is still in progress and the Division of HP anticipates making this information available through license beginning in late summer / early fall of 2002. WHS will make copies of geospatial metadata available for posting on WISCLINC.

1e.
Many levels of government agencies could potentially use these digital geospatial layers for technical integration into their own GIS. In the past, the hard copy maps of site and property locations were constantly referenced for inclusion in other agencies and projects.

2. Software Used to Develop and Provide Access to Geospatial Metadata

The Division of Historic Preservation is in the process of documenting its five map coverages (archaeological sites, historic properties, historic cemeteries, shipwreck sites, and archaeological survey areas) according to the FGDC standards for geospatial metadata. The current software being used in the documentation of the metadata is the MetaLite 1.7.5 program, developed by the United States Geological Survey (USGS) and the United Nations Environment Programme (UNEP). This is software that generates metadata consistent with the FGDC Content Standard for Digital Geospatial Metadata (CSDGM). For the present time, only the digital geospatial data within the WHS will have associated metadata.

3. Metadata Access and Future Plans

At the time of the writing of this plan, the geospatial metadata documenting the map coverages maintained by the Division of HP are not available for public viewing on the WHS website. However, it is the objective of the Division to make the metadata available once the licensing and distribution of the shapefiles is begun. Metadata files will be joined with any data transfer, as well as made available on a public website, outlining the GIS data and services available through the Division of HP.

1f. Land Information from Outside Sources used within the Division of HP

As the Division of HP builds its GIS and ArcIMS map service capabilities, we will be looking to gather more 'basedata' in order to provide better spatial viewing and analysis for our Division users. Additionally, we are interested in acquiring orthorectified aerial imagery, digital tax parcel layers, and addressing coding information for help in correcting and adding new historic and archaeological properties into our map layers. Since we have not yet entered into a phase of distributing the digital map layers here at WHS, there has been little opportunity to explore acquiring further land information from outside sources, other than that which we currently have available.

C. Technology Architecture

At present, the WHS has implemented GIS desktop software within the Division of Historic Preservation. The Internet database applications have a map server component, which is served by the ESRI product ArcIMS.

GIS Desktop Software: The Division of Historic Preservation uses ESRI's ArcView 3.2 (along with the software extensions). ArcInfo 8 is also licensed to the Division, but seldom used.

Web Mapping Software: ESRI ArcIMS 3.1 software is used for the Internet Map Services feeding into the database applications.

Databases: The WHS is in the process of migrating all maintained databases over to an Oracle database environment (Oracle 8i). Database fields are then joined to shapefiles within ArcView.

Metadata Collection Software: The Division of HP uses MetaLite 1.7.5 for the documentation of geospatial metadata.

D. Organizational Architecture

1. Several staff within the Division of HP have received basic ArcView training through the LICGF at UW-Madison. The Division hopes to send representatives to training opportunities offered through the State Cartographer's Office or OLIS in the future.

2. The development of land information sharing agreements is in progress. We anticipate having said agreements drafted by early Fall 2002.

3. The Division has developed a Database Management Team that is a standing committee, with a portion of its responsibility dedicated to developing user/datasharing agreements for geospatial data.

E. Security Architecture

1. The Database Management Team of the Division of Historic Preservation is in the process of defining the policies related to privacy, cost recovery, liability, legal disclaimers, copyright or licensing related to land information, mapping, data distribution, usage, and the Internet. The Team anticipates having these policies drafted by the Fall of 2002.